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US 4706938 A US 4629388 A US 4097022 A
US 2777527 A US 2558535 A US 2063060 A

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(54) Abstract Title
Vehicle wheel jack

(57) A vehicle jack comprises a ground engaging base member 10, an upwardly extending frame 11 supported by the base member, a vertically adjustable support member 12 mounted on the frame and drive means 13 for moving said support member up and down the frame during a jacking operation. Support member 12 includes wheel rim engaging means 26 engageable under the wheel rim of the vehicle, said means preferably extending along an arc corresponding to the shape of the wheel, whereby to lift and lower the vehicle and the associated wheel. In use, the vehicle is lifted using the jack and is then supported by appropriate supports. Preferably, the base has a portion 16 carrying frame 11 and is tiltable to allow limited movement relative to a base plate. Preferably, anti-slip means such as studs are provided on the base plate. The jack can be hydraulic.

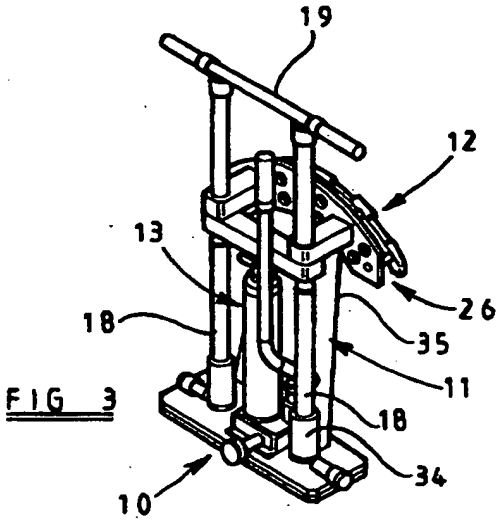

FIG 3

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

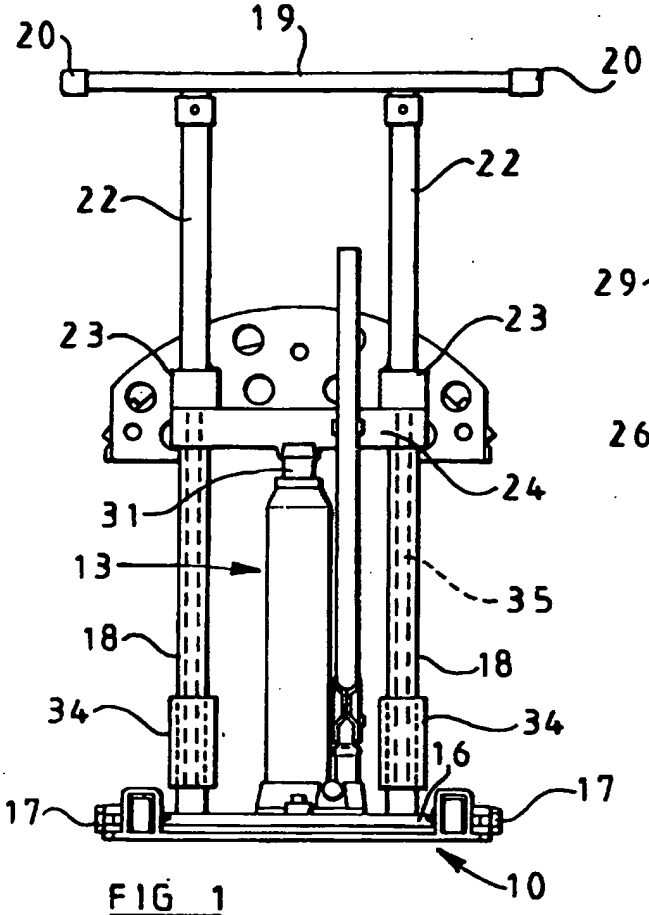

FIG 1

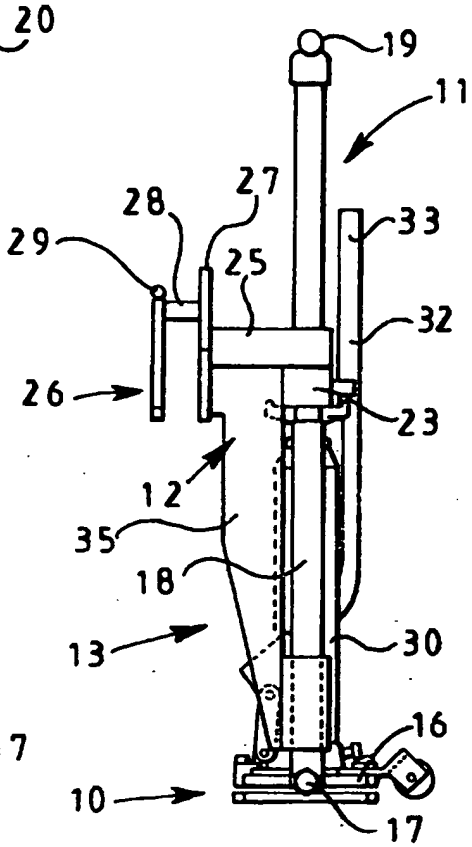

FIG 2

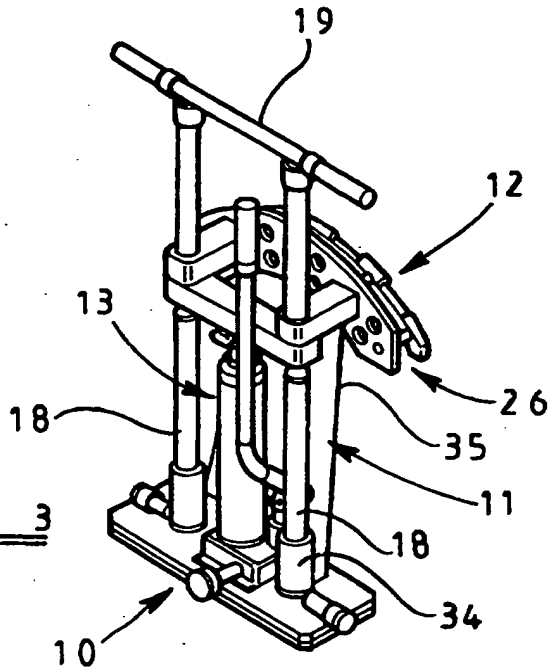

FIG 3

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VEHICLE JACK

This invention relates to vehicle jacks and in particular, but not exclusively, to jacks for large vehicles.

Large vehicles have been developed which have low height chassis and bodywork which provides difficulties in using a conventional vehicle jack because access under the vehicle is restricted. There has therefore developed a requirement for a vehicle jack which is able to lift the vehicle to replace or repair a wheel and associated tyre for such vehicles.

An object of the invention is to provide an improved vehicle jack.

According to the invention, there is provided a vehicle jack comprising a ground engaging base member, an upwardly extending frame supported by the base member, a vertically adjustable support member mounted movably on the frame, and drive means for moving the support member up and down the frame during a jacking operation. The support member includes a wheel rim engaging means engageable under the wheel rim of the vehicle whereby to lift and lower the vehicle and the associated wheel.

The wheel rim engaging means preferably includes a member extending along an arc corresponding to the shape of the wheel rim. The member may also have a convex shape to engage with the concave shape of the wheel rim and be located therein.

The base member preferably comprises two portions, one portion being a base plate engageable with the ground surface, and another portion which carries the frame and is pivotable relative to the base plate to a limited extent whereby, upon operation of the jack, the frame is movable out of a vertical plane relative to the base plate.

The base plate may be fitted with wheels at one side edge whereby to transport the jack. Moreover the base plate is preferably provided with anti-slip means on its under surface to

prevent the jack from slipping when under load during a jacking operation.

In use of the vehicle jack the wheel rim to be replaced or repaired is lifted up by the jack to an elevated position with the wheel clear of the ground, there is then placed under the vehicle a support to retain the vehicle in the elevated position, and the jack is lowered to give access to remove the wheel from the vehicle.

Further features of the invention will appear from the following description of the embodiment of the invention given by way of example only and with reference to the drawings, in which:

Fig 1 is a side elevation of a vehicle jack,

Fig 2 is an end elevation of the jack of Fig 1, and

Fig 3 is a perspective view of the jack of Figs 1 and 2.

Referring to the drawings there is shown a vehicle jack which is suitable for use with a vehicle having wheels formed, adjacent the rim of the wheel, at the junction with the tyre, with a rim portion which is of generally concave shape extending around the wheel. However other rim shapes may be suitable for use with the vehicle jack of the invention. Large vehicles such as buses are particularly suited to the vehicle jack, especially vehicles with a small clearance between the vehicle and the ground, since such vehicles are difficult to jack up due to poor access under the vehicle.

The vehicle jack comprises a base 10 upstanding from which is a frame 11. On the frame is located a vertically adjustable support member 12. Between the support member 12 and the base 10 is located an hydraulic jacking means 13.

The base 10 includes a base plate 15 generally in the form of a rectangular plate formed on

its underside with anti-slip means to inhibit the plate from movement relative to the ground, when under load. The anti-slip means (not shown) may be in the form of pointed studs directed downwardly from the base plate 15.

Pivotally attached to the base plate 15 is a mounting plate 16 which can pivot to a limited extent relative to the base plate about a pivot 17 at each end of the base. The base plate 15 and mounting plate 16 are secured to each other for such pivoting action which enables the mounting plate and associated frame 11 to move to a limited extent out of the vertical plane during operation.

Also secured to the base plate are a pair of rollers (not shown) which are located along one edge of the base plate whereby the jack may be transported on such rollers when not in use, by tilting the jack to cause the rollers to engage the ground with the base plate 15 clear of the ground surface.

The frame 11 comprises a pair of rods 18 fixed at their lower ends to the mounting plate 16 and extending parallel to and spaced from each other. At their upper ends the rods 18 are interconnected by a cross bar 19 having outwardly directed handles 20 at each end whereby the jack may be transported. Towards their upper ends the rods are formed with cylindrical portions 22 along which the support member 12 is guided during an operative movement of the jack.

The support member 12 extends across the jack in a generally horizontal position for movement up and down the cylindrical portions 22. The support member includes slide members 23 each located on a cylindrical portion 22 and interconnected by a horizontal beam 24. Extending to the side of the jack are a pair of arms 25, the outer ends being interconnected by a wheel engaging assembly 26.

Further slide members 34 are each located on a lower portion of the rods 18, spaced from and below the slide members 23. A rigid webbing 35 extends between each further slide member

34 and the respective arm 25 thereby to strengthen and support the support member 12.

The assembly 26 includes a plate 27 of upwardly arcuate profile and the plate 27 has forwardly projecting members 28 arranged along an arc and carrying a series of rim engaging members 29 spaced along the arc of a radius equal to that of the rim of the wheel which is to be engaged. The rim engaging members 29 are generally part cylindrical having a shape, at least along the upper surface, corresponding to the concave shape of that part of the rim of the wheel to be engaged.

The jacking means 13 extends upwardly from attachment to the mounting plate 16 to engage the underside of the horizontal beam 24. The jacking means include an hydraulic piston and cylinder, of which the cylinder is part 30 and the piston rod of the piston is part 31. A handle 32 is operable up and down about a horizontal axis, by use of the hand grip 33, to pump hydraulic fluid and cause the piston and cylinder 30, 31, to extend and contract in conventional manner.

In use of the vehicle jack the jack is manoeuvred to a position alongside a wheel. The rim engaging members 29 are located under and in contact with the upper part of the wheel rim, the handle 32 is operated to cause the piston and cylinder 30, 31 to extend upwards thereby causing the wheel to be raised with the support member 12. Movement of the wheel in the upwards direction continues until the wheel is clear of the ground. The vehicle is then retained in its elevated position by placing a support under the appropriate part of the vehicle to bear the weight of the vehicle, for example under an axle. The vehicle jack is then operated to lower the support member 12 to disengage the member from the wheel. With the vehicle supported by the support (not shown) the wheel can then be detached from the vehicle by release of the wheel nuts in the normal manner. The wheel is then replaced or repaired and the vehicle jack is relocated in position to support the replaced wheel, is operated to lift the vehicle and to release the support under the vehicle and is then lowered so that the replaced wheel re-engages the ground and the jack can be removed.

It will be appreciated that during the lifting and lowering operation the frame 11 will move out of the vertical plane to adopt different positions due to the inclination of the vehicle as it is lifted and lowered. This is provided by the provision of the articulated base plate and associated mounting plate thereby enabling the necessary inclination of the frame to accommodate the changing position of the vehicle.

Claims

1. A vehicle jack comprising:

a base member;

an upwardly extending frame supported by said base member;

a vertically adjustable support member mounted movably on said frame; and

drive means for moving said support member up and down said frame during a jacking operation;

wherein the support member includes wheel rim engaging means engageable under the wheel rim of the vehicle thereby to lift and lower the vehicle and the associated wheel.

2. A vehicle jack as claimed in claim 1 wherein the wheel rim engaging means includes a member extending along an arc corresponding to the shape of the wheel rim.

3. A vehicle jack as claimed in claim 2 wherein the member has a convex shape thereby to engage with the concave shape of the wheel rim and be located therein.

4. A vehicle jack as claimed in claim 2 or 3 wherein the member includes a plurality of forwardly projecting members arranged along an arc, said projecting members carrying a plurality of rim engaging members spaced along the arc, said arc having a radius substantially equal to that of the rim of the wheel to be engaged.

5. A vehicle jack as claimed in claim 4 wherein said rim engaging members are generally part cylindrical having a shape, at least along the upper surface, corresponding substantially to the concave shape to that part of the rim to be engaged.

6. A vehicle jack as claimed in any preceding claim wherein the base member comprises two portions, one portion being a base plate, engageable with the ground surface and the other portion which carries the frame and is pivotable relative to the base plate to a limited extent whereby, upon operation of the jack, the frame is movable out of a vertical plane relative to the base plate.

7. A vehicle jack as claimed in any preceding claim wherein said base member has wheels at one side edge thereof whereby to transport the jack.

8. A vehicle jack as claimed in any preceding claim wherein said base member is provided with anti-slip means on its under surface thereby to prevent the jack from slipping when under load during a jacking operating.

9. A vehicle jack as claimed in claim 8 wherein said anti-slip means comprises downwardly pointing studs.

10. A vehicle jack constructed and arranged substantially as herein described with reference to the accompanying drawings.

The Patent Office

INVESTOR IN PEOPLE

Application No:	GB 9915271.2	**Examiner:**	Matthew Tosh
Claims searched:	1-10	**Date of search:**	13 October 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): B7C (CLG), B8J

Int Cl (Ed.6): B66F 3/00, 3/36, 5/00, 5/02, 5/04, 13/00, B60B 30/06

Other: Online: WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	US 4706938	(YOUNG). See lines 45-51, column 1 and figures.	1
X	US 4629388	(RIEMER). See lines 21-38, column 4 and figures.	1
X	US 4097022	(TAYLOR). See whole document.	1
X	US 2777527	(KLEEM). See whole document.	1,2,6
X	US 2558535	(BILLINGS). See especially figure 2.	1
A	US 2063060	(SHEETZ).	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.